

NAMES OF NEW WORLD CYPRESSES (CUPRESSUS)

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Under a conservative interpretation, 8 species of cypress, genus Cupressus L. (family Cupressaceae or Pinaceae), are native in the New World. Three can be divided further into a total of 10 varieties to make 15 distinguishable taxa, which have been regarded also under a narrow concept as 15 species. In this summary of the classification and nomenclature, 2 new combinations are made. Also, a few notes including range extensions have been compiled and added here.

In the New World the genus Cupressus L. (cypress) is native from southwestern Oregon and California to the Chisos Mountains of Trans-Pecos Texas and south through Mexico to Honduras. As interpreted here, the United States has 7 native species, all represented in California. Oregon, Arizona, New Mexico, and Texas have 1 species each. Mexico has 3 species, of which 2 are also in the United States and the third extends southward in mountains to Guatemala and Honduras.

The ancient coniferous genus Cupressus L. (cypress) is represented now by many disjunct, scattered or isolated, apparently relic populations, few enough to be counted. Among these groves morphological differences of varying degrees have been recorded. Many names, mostly at rank of species and variety, have been proposed. A re-evaluation of the nomenclature is needed for forthcoming Forest Service studies, including "Atlas of United States Trees, Volume 1, Conifers and Important Hardwoods" now in press and the revision of "Woody-plant Seed Manual" (Forest Service, U. S. Dep. Agr. Misc. Pub. 654, 416 p., illus. 1948).

A comprehensive monograph, based on detailed studies of both wild and cultivated plants, was prepared by Carl B. Wolf (Taxonomic and distributional studies of the New World cypress. *Aliso* 1: 1-250, illus. 1948; Horticultural studies and experiments on the New World cypresses. *Aliso* 1: 325-444, illus. 1948). Few native tree genera in the United States have been studied as intensively in the field and garden. Full field notes were published. Herbarium specimens cited were mostly those relating to nomenclature, including types, and collections by the author. Though specimens were annotated, those in a few large herbaria apparently were not examined.

The problem of specific concepts in Cupresses was discussed by Wolf (1948, p. 4-5, 17). He quoted Willis Linn Jepson (*Man. Fl. Pl. Calif.* 57. 1923): "The species depend for their

separation on characters that are too vague and it might be better to receive a less number of them. Their history is as yet little known and new stations are still being discovered." Wolf agreed "that the species rest or rather insecure morphological features..." He rejected as unsatisfactory "The most drastic treatment" of lumping all the material into 7 species. If no subspecies were recognized, then horticulturists would need an elaborate set of other names. Or if numerous subspecies were recognized, the number of taxonomic units would be about the same, except that a number of new combinations would be needed.

For the New World cypresses, Wolf accepted 15 species (1 with 2 subspecies), including 12 in the United States and 10 in California. Two species and 1 subspecies were proposed as new. However, only Cupressus stephensonii was really new, the others having been collected for many years. No additional taxa of Cupressus native in the United States have since been named. This monograph has been followed in local floras in California, as well as the State flora by a colleague, Philip A. Munz (Calif. Flora 59-62. 1959).

Wolf apparently considered use of the rank subspecies. A few herbarium specimens bear his annotation labels of a species reduced to a subspecies, but the new combination was never published. Also, Maximino Martínez (Los Cupressus de México. Méx. Inst. Biol. An. 18: 71-141, illus. 1947) wrote (p. 119), as follows: "El doctor C. B. Wolf del Jardín Botánico de Santa Ana, Anaheim, Cal., quien se ha ocupado en estudiar los Cupressus norteamericanos, considera en el arizonica Greene dos subspecies: la subespecie typica y la subespecie glabra Sudw. Su trabajo está inédito."

In contrast, two outstanding California botanists, authors of floras, actually reduced their own species. Cupressus nevadensis Abrams (Torreya 19: 92. 1919) became C. macnabiana nevadensis (Abrams) Abrams (Illus. Fl. Pacif. States 1: 73. 1923). C. bakeri Jepson (Fl. Calif. 1: 61. 1909; "bakeri") was united as C. macnabiana var. bakeri (Jeps) Jeps. (Man. Fl. Pl. Calif. 58, fig. 50c. 1923).

Almost doubling the number of accepted species in a native tree genus does suggest the desirability of further study. If the species concept is to remain stable, excessive splitting of familiar tree species in the United States is to be discouraged. The "rather insecure morphological features" are emphasized in Wolf's key (1948, p. 48-51). In transferring 4 species as varieties of a fifth, I commented (Varietal transfers in Cupressus and Chamaecyparis. Madroño 18: 161-167. 1966.), as follows: "His key to species illustrated the scarcity of well-defined qualitative morphological characters. Many characters used, such as color of foliage, size of parts, and bark, would not be of specific value in related genera. As Wolf observed, there has

been confusion in taxonomic literature of Cupressus and disagreements on ranks and synonymy. And the same author has changed his concepts."

Clayton E. Posey and James F. Goggans (Observations on species of cypressa indigenous to the United States. Auburn Univ. Agr. Exp. Sta. Cir. 153, 190., illus. 1967) made detailed field studies in a project on genetic improvement of cypresses for growing Christmas trees in the Southeast. In 1954 they visited stands of all 13 kinds of cypress accepted by Wolf as native in the United States, using the scientific nomenclature of Little (1966), 7 species and 4 additional varieties, also 2 kinds with common names. They observed a tremendous amount of variation in most morphological characteristics in trees both within a grove and among groves. A few additional stations were recorded along with descriptive notes on the cypress trees in different stands.

These investigations were continued by the same authors, Posey and Goggans (Variation in seeds and ovulate cones of some species and varieties of Cupressus. Auburn Univ. Agr. Exp. Sta. Cir. 160, 23 p., illus. 1968). They made quantitative statistical studies of variation in seeds and cones from the different species, varieties, and geographic sources native in the United States. In spite of the tremendous amount of variation found in most morphological characteristics within and among groves, few taxa or geographic sources could be distinguished by extremes in seed weight and cone weight. Cones of Cupressus macrocarpa could separated from all others by the larger number of cone-scales. Slight differences in seed color were observed also. It was suggested that there may have been one widespread species throughout the Southwest. Environmental conditions changed faster than the species could evolve; thus the species has retreated to a few small environmental niches still suitable for growth and reproduction. Decreased population size, geographic isolation, and different selection pressures have produced enough variation so that some groves are now classified as different species.

Names accepted for New World cypress (Cupressus) by several authors are summarized in Table 1. The nomenclature adopted here is in the column at left. Blank spaces show that some works were limited in geographic coverage or were published before the taxa were named. Charles Spragus Sargent (Silva 10: 97-110, illus. 1896) accepted for the continent north of Mexico 4 species of Cupressus and 3 others afterwards placed universally in the segregate genus Chamaecyparis. Later, Sargent (Man. Trees No. Amer. ed. 2, 69-75, illus. 1922; also ed. 2, corr. 1926) distinguished 6 species, 1 with a named variety. George B. Sudworth (Check List Forest Trees U. S. 36-38. 1927) listed 7 species. Nathaniel L. Britton and John A. Shafer (No. Amer. Trees 97-102. 1908) recognized 5 species, mentioning also C. guadalupensis S. Wats. from Lower California and "two or three others in Mexico."

For California, Willis Linn Jepson (Fl. Calif. 57-58. 1923) had 7 species, also 1 variety reduced from his own species. Leroy Abrams (Illus. Fl. Pacif. States 1: 72-73. 1923) described and illustrated 5 species, 1 with a trinomial from his own binomial.

It is significant to note from Table 1 the general agreement among authors in accepting the first named, well defined species of Cupressus published before 1900. These, in chronological order, are: lusitanica (1768), macrocarpa (1847-49), goveniana (1849), macnabiana (1855), guadalupensis (1879), arizonica (1882). The specific rank of later binomials has been questioned.

While working in Arizona from 1953 to 1941, I learned of the uncertainty among local foresters whether there were one or two species of Cupressus. I united C. glabra with C. arizonica, stating that the two were separated only by bark characters and different range (Amer. Jour. Bot. 31: 592-593. 1944).

My conservative compilation differing only slightly from Sargent (1922) and Sudworth (1927) accepted 6 species of Cupressus without varieties (Check List Native Naturalized Trees U. S. U. S. Dept. Agr., Agr. Handb. 41: 170-172. 1953). This classification, following "the most drastic treatment" that Wolf (1948, p. 4-5) could conceive, was practical but not entirely satisfactory. For example, foreigners seeing the other specific names in print, would ask for seeds under those names. Though foresters commonly designate seed collections by locality, names for minor variations often are useful. Thus, I transferred 4 species as varieties of a fifth, Cupressus arizonica Greene (Varietal transfers in Cupress and Chamaecyparis. Madroño 18: 161-167. 1966). Also, I accepted a seventh species, C. sargentii Jeps., one of the most widespread species in California known by about 20 or more groves.

Here I am adopting the intermediate treatment mentioned by Wolf, the smaller number of species with minor variations as varieties (not subspecies, as he suggested). Incidentally, usage by some authors of the rank subspecies for geographic variations is confusing. Other, including the Forest Service, retain the classical rank variety for geographic as well as other variations. Still others use both ranks. Originally, the subspecies was intended to be an optional intermediate rank used mainly in species with a large number of varieties.

The classification accepted here in Table 1 is almost the same as Wolf's with about the same number of taxa (actually 1 less) but with slightly different nomenclature and some trinomials. Fortunately, the epithets are identical and the changes in nomenclature are minor. This classification has 8 species, 3 further divided into 7 varieties besides the 3 typical varieties. It seems more natural, with species concepts similar to those of

	Little (1970)	Little (1953)	Wolf (1948)	Sudworth (1927)
1.	arizonica	arizonica		
	var. arizonica	(arizonica)	arizonica	arizonica
	var. glabra	(arizonica)	glabra	glabra
	var. montana		montana	
	var. nevadensis	(arizonica)	nevadensis	(macnabiana)
	var. stephensonii	(arizonica)	stephensonii	
2.	bakeri	bakeri	bakeri	(macnabiana)
3.	goveniana	goveniana		goveniana
	var. goveniana	(goveniana)	goveniana	
	var. abramsiana	(goveniana)	abramsiana	
	var. pygmaea	(goveniana)	pygmaea	(goveniana)
4.	guadalupensis	guadalupensis		guadalupensis
	var. guadalupensis	(guadalupensis)	guadalupensis	
	var. forbesii	(guadalupensis)	forbesii	(guadalupensis)
5.	lusitanica		lusitanica	
6.	macnabiana	macnabiana	macnabiana	macnabiana
7.	macrocarpa	macrocarpa	macrocarpa	macrocarpa
8.	sargentii	(goveniana)	sargentii	sargentii

	Sargent (1922)	Sargent (1896)	Abrams (1923)	Jepson (1923)	Jepson (1909, 1910)
1.	arizonica	arizonica			
	var. bonita				
	(macnabiana)		macn. nevad.	nevadensis	
2.	(macnabiana)		(macnabiana)	macn. v. bakeri	bakeri
3.	goveniana	goveniana	goveniana	goveniana	goveniana
	(goveniana)		(goveniana)		
4.	guadaloup.	guadalup.	guadalup.	pygmaea	
	(guadaloup.)		(guadalup.)	forbesii	
5.					
6.	macnabiana	macnabiana	macnabiana	macnabiana	macnabiana
7.	macrocarpa	macrocarpa	macrocarpa	macrocarpa	macrocarpa
8.	sargentii		sargentii	sargentii	sargentii

Table 1. Names accepted for New World cypresses (*Cupressus*) by different authors. The lower half of the table is a continuation of the right edge of the upper half.

other genera of conifers.

One taxon was first published as variety, Cupressus goveniana var. pygmaea Lemm. (Handb. W.-Amer. Cone-bearers. Ed. 3, 77. 1895; as "pigm a" but corrected in ink to "pygmaea"). Four varietal transfers were made earlier (Little 1966), and the other 2 are published below.

CUPRESSUS GOVENIANA Gord. Gowen cypress
Cupressus goveniana Gord., Hort. Soc. London Jour. 4: 295,
 fig. 1849.

CUPRESSUS GOVENIANA Gord. var. GOVENIANA Gowen cypress (typical)

This species, the second to be named from California, is known in its typical variety from 2 groves in Monterey County, California, near the 2 groves of the related first species, Cupressus macrocarpa Hartw., Monterey cypress. Wolf (1948, p. 211, etc.) noted also the close relationships with C. pygmaea, C. abramsiana and C. sargentii. Unfortunately, one grove was reported in 1969 to be endangered by gravel operations.

CUPRESSUS GOVENIANA var. PIGMAEA Lemmon Mendocino cypress
Cupressus goveniana var. pygmaea Lemm., Handb. W.-Amer.
 Cone-bearers. Ed. 3, 77. 1895; as "pigm a" but corrected
 in ink to "pygmaea."

This taxon is confined to 2 main coastal areas near Fort Bragg and Mendocino City, Mendocino County, California. It grows on the Medocino White Plains or Pine Barrens. Some plants on the sterile white sandy soil over a hard clay are dwarf, flowering when only 1-2 feet high but others are shrubs, slender poles, and trees becoming more than 150 feet high. Thus the names pygmy cypress and dwarf cypress are misleading.

Type collection: As noted by Wolf (1948, p. 200), the Lemmon Herbarium (UC) has 3 sheets (I saw also a fourth) of which the following was designated as the holotype: J. G. Lemmon and wife s. n., 188-, "Cupressus Goveniana, var. pygmaea n. var. ined. White, ashy plains, near Mendocino" (UC 185946).

A similar example is noted in Pinus contorta Dougl., shore pine or lodgepole pine. On the pine barrens of Medocino County, Calif., are slender dwarf plants only 2-5 feet high, with very small cones. These dwarf pines have been designated as a variety, var. bolanderi (Parl.) Vasey, or subspecies, ssp. bolanderi (Parl.) Critchfield, or are not distinguished by name. They are not accepted as a separate species. Likewise, the cypress plants on the same site originally named Cupressus goveniana var. pygmaea Lemmon are better treated as a variety than species.

CUPRESSUS GOVENIANA Gord. var. *ABRAMSIANA* (C. B. Wolf) Little,
comb. nov. Santa Cruz cypress

Cupressus abramsiana C. B. Wolf, *Aliso* 1: 215, figs. 4 C,
A 15-17, 13 B, 36. 1948.

Santa Cruz cypress is known from the Santa Cruz Mountains of the California Coast Ranges, 2 localities in Santa Cruz County and 1 in adjacent San Mateo County. This taxon was collected as early as 1881. Specimens had been referred to *C. sargentii* and *C. goveniana* until Wolf named them as a new species.

Calvin McMillan (The third locality for *Cupressus abramsiana* Wolf. *Madroño* 11: 189-194, illus. 1951) concluded that *C. abramsiana* was "a discrete but highly variable entity," not so close to *C. goveniana* as was *C. pygmaea*. As the characteristics were in some respects intermediate between *C. sargentii* and *C. goveniana*, a hybrid origin might be hypothesized. He noted that according to the fossil record, *Cupressus* grew at many places along the coast of California where now absent.

CUPRESSUS GUADALUPENSIS S. Wats. var. *FORBESII* (Jepson) Little,
comb. nov. Tecate cypress

Cupressus forbesii Jepson, *Madroño* 1: 75. 1922.

The typical variety of *Cupressus guadalupensis* S. Wats. (*Amer. Acad. Arts. and Sci. Proc.* 14: 300. 1879), Guadalupe cypress, is native only on Guadalupe Island off the Pacific coast of Baja California, Mexico. It is described as highly variable in foliage, cones, and bark (John Thomas Howell, *Leafl. West Bot.* 3: 145-146. 1942; Sherwin Carlquist 461, UC). According to Wolf's key, the main difference between the 2 taxa is in the number of scales on the male strobili, generally 14-18 in *C. guadalupensis* and 10-14 in *C. forbesii*.

Cupressus guadalupensis var. *forbesii* is known from several groves or localities in Orange and San Diego Counties, California, and the mainland of northwestern Baja California (Wolf 1948, p. 160-166; also collections seen at SD and UC). According to Wolf, Tecate cypress was discovered Dec. 30, 1907 by Charles N. Forbes, who identified it as conspecific with *C. guadalupensis* (Jepson, *Trees Calif.* 121. 1909). However, Edgar A. Mearns collected a specimen there in 1894. Jepson (*Silva Calif.* 158. 1910) also had referred it to *C. sargentii* Jeps. S. B. Parish (*The Tecate cypress. S. Calif. Acad. Sci. Bull.* 13: 11-13, illus. 1914) likewise placed Tecate cypress in *C. sargentii*, though the characters did not agree in all respects.

Type collection: *C. N. Forbes s. n.* Dec. 30, 1907, Cedar Canyon between El Nido and Dulzura [N. side Otay Mt.], San Diego Co., Calif. (holotype seen at JEPS, isotypes seen at UC

(9 sheets) and US. An earlier collection at the same locality is Edgar A. Mearns 3892, July 5, 1894 (US).

Perhaps the most accessible grove of Tecate cypress, as noted by Wolf, is located on U. S. Highway 80 about 40 miles E. of San Diego in San Diego County toward Imperial Valley. The conspicuous trees rising above the chaparral vegetation are visible near the south side of the highway. The exact locality is adjacent to Guatay Campground on the north side of Guatay Mountain 1 mile west of Guatay P. O. on the Cleveland National Forest, Sec. 21, T. 15 S., R. 4 E., altitude about 4,000 feet. I visited the Guatay Campground grove on Jan. 12, 1970 and saw trees to 30 feet high and 1 foot in trunk diameter with reddish brown bark, smoothish and peeling off (fig. 1).

Pinus radiata D. Don, Monterey pine, has a similar distribution pattern. The typical variety is local on the coast of central California in Santa Cruz, Monterey, and San Luis Obispo Counties. A variety, P. radiata var. binata (S. Wats.) Lemm. (or 2 forms) is confined to Guadalupe Island.

LIST OF NEW WORLD CYPRESSES

The species and varieties of cypresses (genus Cupressus L.) native in the New World as accepted here are listed below (in alphabetical order) with both scientific names and English common names. Citations of place of publication of scientific names not mentioned in this article are given by Wolf (1948) and Little (1953).

1. Cupressus arizonica Greene, Arizona cypress
 var. arizonica, Arizona cypress (typical) (or Arizona rough cypress)
 var. glabra (Sudw.) Little, Arizona smooth cypress
 var. montana (Wiggins) Little, San Pedro Mártir cypress
 var. nevadensis (Abrams) Little, Piute cypress
 var. stephensonii (C. B. Wolf) Little, Cuyamaca cypress
2. Cupressus bakeri Jeps., Modoc cypress
3. Cupressus goveniana Gord., Gowen cypress
 var. goveniana, Gowen cypress (typical)
 var. abramsiana (C. B. Wolf) Little, Santa Cruz cypress
 var. pigmaea Lemm., Mendocino cypress
4. Cupressus guadalupensis S. Wats., Guadalupe cypress
 var. guadalupensis, Guadalupe cypress (typical)
 var. forbesii (Jeps.) Little, Tecate cypress
5. Cupressus lusitanica Mill., Mexican cypress
6. Cupressus macnabiana A. Murr., MacNab cypress
7. Cupressus macrocarpa Hartw., Monterey cypress
8. Cupressus sargentii Jeps., Sargent cypress



Fig. 1. A mature tree of Tecate cypress (Cupressus guadalupensis var. forbesii) about 30 feet high and 1 foot d.b.h., at the Guatay Campground grove.



Fig. 2. The only grove of Cuyamaca cypress (Cupressus arizonica var. stephensonii), from the southeast. Across the middle distance beyond the creek bed, a line of rounded cypress trees rises above the chaparral.

THE NORTHERNMOST CYPRESS

The northernmost grove of cypress in the New World is a nearly pure stand of 2 acres of Modoc cypress, Cupressus bakeri Jeps., on the Rogue River National Forest $4\frac{1}{2}$ miles west of Prospect and about 30 miles northeast of Medford, Jackson County, Oregon. This isolated station was first reported in 1953 by Oliver V. Matthews, of Salem. An authority on Oregon Trees, he collected herbarium specimens (Matthews s. n., Sept. 30, 1953; UC, US), took photographs of the trees, and gave publicity in newspaper articles. "Flounce Rock Grove" had been known since 1926 but was considered to be a juniper. The trees reached a height of 75 feet and trunk diameter of 22 inches. The exact locality is SE $1/4$, SW $1/4$. Sec. 33, T. 32 S., R. 2 E., the latitude $42^{\circ} 45' N.$, and the altitude, 4,000 feet.

The highway between Medford and Crater Lake National Park passes within 3 miles of this grove. However, the site is not readily accessible because of rough mountainous topography and absence of a trail. This locality represents a range extension of about 60 miles northeast from the Steve Peak area in the Siskiyou Mountains of southeastern Josephine County. Mr. Matthews took me to the Miller Lake grove in the Steve Peak area on June 23, 1961, but a visit to the northernmost site was not made.

The name Cupress bakeri ssp. matthewsii C. B. Wolf (Aliso 1: 83, figs. 3 C, 7 B, 22. 1948), Siskiyou cypress, was given to the northern populations. However, the characters in the key (p. 72-73) seem scarcely sufficient for division of the species into 2 varieties.

This species is the hardiest of the true cypresses, according to Alfred Rehder (Man. Cult. Trees Shrubs Ed. 2, 56. 1940). He placed it as hardy under particularly favorable conditions as far north as Zone 5, in which the average annual minimum temperatures are -10° to -5° F.

Reports of Cupressus from the State of Washington represent introductions. The Forest Service Herbarium has a specimen of Cupressus macrocarpa Hartw. from near Ilwaco, Pacific Co., about 10 miles N. of Columbia River, recorded by the collector Everett Miller as 24 in. D.B.H. and "apparently native." My inquiry some years ago led to information about a plantation there. The coastal strip has a mild, subtropical climate.

CUYAMACA CYPRESS

The rarest of the named cypresses, Cupressus arizonica var. stephensonii (C. B. Wolf) Little (C. stephensonii C. B. Wolf) is known from a single grove in Cuyamaca Mountains, San Diego County, described by Wolf (1948, p. 125-130). The locality is about 40 miles east of San Diego and about 5 miles north of Descanso Ranger



Fig. 3. Large dead fire-blackened Cuyamaca cypress (Cupressus arizonica var. stephensonii) about 40 feet high and nearly 3 feet in trunk diameter, possibly the type tree.



Fig. 4. Thickets of slender young plants of Cuyamaca cypress (Cupressus arizonica var. stephensonii) to 20 feet high from seed germination after the 1950 fire.

Station, also about 6 miles by air line NNW. of the Guatay Campground stand of Cupressus guadalupensis var. forbesii.

This stand less than 1 mile long is partly within the Cleveland National Forest and Cuyamaca Rancho State Park and thus is doubly protected. On Jan. 12, 1970 I visited this area with officials from both the U. S. Forest Service and the State Park. The site at about 4,000 feet altitude is reached by a walk of about $\frac{1}{2}$ mile west from the end of the nearest truck trail in the park.

As noted by Wolf, the cypress trees are scattered over a chaparral slope near the headwaters of King Creek. The grove is about 1 mile SSW. of Cuyamaca Peak, altitude 6512 feet and the highest point in these mountains, and about $\frac{1}{2}$ mile W. of Japacha Peak, altitude 5825 feet. According to a Forest Service boundary marker yellow metal sign found among the trees, most of the cypresses are within the Cleveland National Forest, mainly in Sec. 30, T. 14 S., R. 4 E., San Bernardino P. M., partly in Sec. 19, and partly extending northeast into Cuyamaca Rancho State Park (unsurveyed). Figure 2 shows this grove from a distance.

The largest Cuyamaca cypresses seen were 30-35 feet high and more than 2 feet in trunk diameter. The bark was smoothish light gray, with mottled patches of pink brown.

Some cypresses were killed by a fire in 1950, as recorded by Posey and Goggans (1967). Among these was a dead fire-blackened tree about 40 feet high and nearly 3 feet in trunk diameter, shown in figure 3, possibly the large type tree photographed by Wolf (1948, p. 128-129, fig. 26 A and B). Thickets of slender young plants to 20 feet high surrounded the dead trees from seed germination after the 1950 fire (fig. 4). The number of trees could be reduced by successive fires in reproduction too small to bear cones. Cultivation of trees elsewhere would be a precaution against extinction.

CYPRESS IN NEW MEXICO

Early reports of Cupressus arizonica Greene as native in New Mexico have been questioned by recent collectors. E. O. Wootton and Paul C. Standley (Flora New Mexico 35-36. 1915) recorded this species from the southwestern corner of New Mexico. However, the specimens cited from San Luis Mountains, Edgar A. Mearns 437, 560, 2244 (US), all came from south of the border in Mexico. These specimens were collected by Mearns with the International Boundary Commission, United States and Mexico, 1892. For example, Mearns 437 was collected at the summit of San Luis Mts. 2 mi. S. of the boundary line, according to the label. These mountains extend northward across the international boundary less than 3 miles. Later collectors have found no cypress on the New Mexico side but report magnificent specimens a 3 to 4 miles southward in Mexico near the northeastern corner



Figs. 5, 6. Arizona cypress (Cupressus arizonica) at the Cooks Peak grove in New Mexico. Photographs by Sidney P. Gordon, February 1956.

of Sonora.

The only record of Cupressus arizonica as native in New Mexico is a grove on Cooks Peak in the southwestern part of the State. This isolated peak (altitude 8400 feet) is a familiar landmark about 15 miles north of Deming in Luna County. I am indebted to Sidney P. Gordon, of the U. S. Forest Service, for the following information and for the two photographs of cypress trees (figs 5, 6). This grove of Arizona cypress is located on a long spur ridge which extends east from the northeast corner of Cooks Peak and in the area where the spur leaves the peak. The altitude was estimated to be about 8000 feet and the area of the grove at least 10 acres. This grove was discovered by Mr. Gordon about 1954 during a big game census on Cooks Peak. The two photographs were taken in February 1956.

A report of Cupressus glabra Sudw. from Nevada doubtless represents an introduction. Gordon W. Gullion (Notable Nevada plants. Leaflet. West. Bot. 9: 225-233. 1962) recorded 2 small trees from Virgin Mt. 11 mi. S. of Mesquite, Clark Co., Nevada. He noted that they might have been transplanted from another location.

CYPRESS IN TEXAS

Arizona cypress (typical) occurs in Texas only in Chisos Mountains within Big Bend National Park in Brewster County. One small grove was known from near Boot Spring, according to W. B. McDougall and Omer E. Sperry (Plants of Big Bend National Park 23, fig. 14-15. 1951) and Donovan S. Correll (Flora of Texas 1: 338-339. 1966).

Posey and Goggans (1967) reported the discovery of an extensive grove of several thousand trees on East Rim only a few miles from the first. Fortunately these isolated stands in Trans-Pecos Texas are protected within a national park.

MEXICAN CYPRESS

It is convenient to regard Mexican cypress or ciprés as a single variable species under the oldest name, Cupressus lusitanica Mill. and without named varieties. As the entire natural range is south of the border, the infraspecific nomenclature need not be considered here. Some geographic variation is to be expected in this species of relatively broad range, and names are already available. Principal synonymy follows:

- CUPRESSUS LUSITANICA Mill. Mexican cypress
Cupressus lusitanica Mill., Gard. Dict. Ed. 8, Cupressus
 No. 3. 1768.
Cupressus benthami Endl., Syn. Conif. 59. 1847.
Cupressus lindleyi Klotzsch ex Endl., Syn Conif. 59. 1847.

Cupressus knightiana Knight & Perry ex Gordon, Pinetum
61. 1858.

A detailed study of Cupressus lusitanica Mill. in Portugal was made by João do Amaral Franco (A Cupressus lusitanica Miller notas acerca da sua história e sistemática. Agros 28: 3-27, illus. 1945). He concluded that this species is native of Central America and was introduced into Portugal more than three centuries earlier. Noting the extreme variability, he distinguished 2 subspecies, 6 varieties, and 3 forms.

Wolf (1948, p. 147-158, illus.) also cited additional names and references and reviewed the history of this species. He noted that though named for Portugal, this plant was believed by Philip Miller to have been introduced from Goa, India. Later authors concluded that the native home was Mexico. As the oldest name, Cupressus lusitanica replaces names based on specimens collected in Mexico.

Meanwhile, Maximino Martínez (Los Cupressus de Mexico. Mex. Inst. Biol. An. 18: 71-149, illus. 1947) published his monograph accepting for Mexico 6 species, 4 occurring also north of the border and treated by Wolf under the same names. He excluded Cupressus lusitanica as not Mexican but accepted instead 2 species, C. benthamii Endl. and C. lindleyi Klotzsch. Wolf received the publication by Martínez while his own was in page proof and in a postscript (p. 437-438) graciously accepted the treatment by Martínez. However, under the International Code of Botanical Nomenclature Miller's older name has been identified and adopted.

Paul C. Standley and Julian A. Steyermark (Flora Guatemala 24(1): 27-32, fig. 5. 1958) accepted Cupressus lusitanica Mill. as the oldest name for the complex taxon present in Guatemala and Mexico, noting considerable variation in wild and cultivated plants.

Cupressus lusitanica is known also from one almost inaccessible locality in northwestern Honduras, the summit of Cerro Santa Bárbara. The discovery in April 1951 was reported by Paul H. Allen (The conquest of Cerro Santa Bárbara, Honduras. Ceiba 4: 253-270, illus. 1955). In citing that record, Antonio Molina R. (Coníferas de Honduras. Ceiba 10: 5-21, illus. 1964) noted that the cultivated cypresses of that country were from other sources.

This species has been planted extensively as an ornamental and forest tree southward in mountains in Costa Rica and the Andes. However, as stated by Paul C. Standley (Flora of Costa Rica 65. 1937) and as I have observed, cypress is not native in Costa Rica.

PRESERVATION OF CYPRESS GROVES

Wolf (1948, p. 9-10, 16) noted that cypresses are of very limited area and are endangered by man. He made a plea for preservation and protection of some of these stands and listed the most outstanding grove or station of each kind. His suggestion is timely today, partly because destruction and disturbance of native vegetation have continued, some species have become endangered, and interest in preservation has increased. He stated:

"The total areas now occupied by cypresses in North America are so limited that it would be perfectly feasible to set the major portion of them (at least those stands in the United States) apart as cypress reserves where grazing, excessive cutting or other destructive agencies could be eliminated and adequate measures for protection from fire provided."

Wolf and others have noted that cypresses are adapted to fire, like certain pines. Examples are lodgepole pine (Pinus contorta var. latifolia Engelm.) of the Rocky Mountains and sand pine (P. clausa (Chapm.) Vasey) of Florida. The cones persist tightly closed on the trees several years, opening in the heat of an infrequent forest fire which also kills the trees and ground vegetation. The seeds fall to the ground and germinate on the exposed soil. Thickets of young cypresses form another generation of trees.

A series of properly timed fires could destroy all the mature cypresses and the ensuing seedlings before seed production, according to Wolf. Possibly two or three severe fires could eliminate a grove. However, under natural conditions, wild fires are infrequent where the conifers have the closed-cone adaptation. For example, after a fire, the ground cover probably is not sufficiently dense for several years to support another destructive crown fire. Also it is unlikely that every seed bearing tree would be killed. Being adapted to fire, cypresses are hardy. They might be replaced by other species if fire were entirely eliminated by protection. However, man has increased the frequency of fires. Clearing of land, real estate development, and intensive grazing are other destructive agents of man.

It is encouraging to note that no cypress grove has been destroyed and that several additional stands have been discovered in recent years. In California several new stations unknown to Wolf in 1948 have been recorded in published references. A few additional localities from other States are mentioned here.

Fortunately, representative groves of some kinds of cypresses on public lands have already been given special protection or management. Action is pending or planned on others. For example, groves of Arizona cypress (typical; Cupressus arizonica var. arizonica) are within Big Bend National Park of Texas and Chiricahua National Monument of Arizona. Posey and Goggans (1967) reported the discovery of additional trees in Rincon Mountains within Saguaro National Monument in Arizona, also in the Galiuro and Winchester Mountains, both within Coronado National Forest. Galiuro Mountains are further protected as the Galiuro Wilderness Area.

Arizona smooth cypress (Cupressus arizonica var. glabra) is rare in Sierra Ancha Experimental Forest within Tonto National Forest in Gila County, Arizona, according to Charles P. Pase and R. Roy Johnson (Flora and vegetation of the Sierra Ancha Experimental Forest, Arizona. USDA Forest Serv. Res. Pap. RM-41 19 p., illus. 1968). While stationed there from 1935 to 1937, I was told about this stand in a remote area but did not have occasion to visit it. Also, in recent years foresters have reported another station in the Supersition Mountains east of Phoenix in Pinal County. This stand is protected within the Supersition Wilderness Area of the Tonto National Forest.

Cypresses are preserved in two new natural areas on public lands (Report of the Committee on Natural Areas. Jour. Forestry 68(1); 57-58, 60-61. Jan. 1970). Casner Canyon Natural Area of the UL SL Forest Service in Coconino County, Arizona, has as its primary type Arizona cypress (Cupressus arizonica var. glabra). Timbered Crater Baker Cypress Natural Area of the Bureau of Land Management in Modoc and Siskiyou Counties, California, has Baker cypress woodland (Cupressus bakeri Jeps.) as its primary type.

The range of Piute cypress (Cupressus arizonica var. nevadensis) in Piute Mountains and vicinity, Kern County, California, is partly within the Sequoia National Forest. The U. S. Forest Service is giving special protection to these groves.

Fires in California vegetation during September 1970 were the most extensive ever recorded. In the mountains east of San Diego, where the chaparral type is characteristic, more than 175,000 acres were burned on the Cleveland National Forest and adjacent areas. Fortunately, the two cypress groves mentioned and illustrated in this article (figs. 1-4) were in unburned parts and escaped damage.

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